# Engineered Immunotoxins: Improved Targeting for Cancer Therapeutics

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**Keywords:** Therapeutics, Cancer / Neoplasm: Cancer, Immunotherapy, antibody conjugate, immunotoxin, Pseudomonas exotoxin A

**Summary:**
Antibody conjugates were engineered for improved therapeutic effectiveness through design of specific furin cleavage sites for particular immunotoxins.

**Description of Technology:**
Immunotoxins (antibody conjugates) target cancer cells while allowing normal cells to survive. As a result, patients receiving immunotoxins are less likely to experience the deleterious side-effects associated with non-specific therapies such as chemotherapy. In order to make an effective immunotoxin, three components are generally required: a targeting domain, a toxic payload molecule such as Pseudomonas exotoxin A (PE), and a furin cleavage site (FCS). The purpose of the FCS is to allow the toxin domain to be processed by the target cell so that it can exert its toxic effect. Researchers at the National Cancer Institute's Laboratory of Molecular Biology engineered an FCS and improved the efficacy of specific immunotoxins having distinct targeting domains. Several novel FCS were generated that can be substituted for the native FCS in PE. By using specific FCS with different targeting moieties, it is possible to engineer an immunotoxin that is better suited to treating specific types of cancer.

**Potential Commercial Applications:**
- Essential for the payload component of immunotoxins
- Treatment of diseases associated with increased or preferential expression of a specific cell surface receptor such as hematological cancers, lung cancer (including mesothelioma), ovarian cancer, breast cancer, and head and neck cancers

**Competitive Advantages:**
- Improved therapeutic effectiveness through design of specific furin cleavage sites for particular immunotoxins
- Improved cleavage and enhance toxin efficacy
- Targeted therapy decreases non-specific killing of healthy cells, resulting in fewer non-specific side-effects

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**Development Stage:**
-- Discovery (Lead Identification)

**Publications:**
- Weldon JE, et al. PMID:25997032
- Weldon JE, et al.PMID:18988862

**Patent Status:**
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**Related Opportunities:**
E-262-2005, E-292-2007, E-269-2009, E-174-2011, E-263-2011